

Superfund Program Proposed Plan



SDMS DocID 2074557



Bally Ground Water Contamination Superfund Site

EPA ID#PAD061105128

Borough of Bally, Berks County, PA

March 2007

EPA Announces Cleanup Plan for Bally public water system (Operable Unit 2)

This Proposed Remedial Action Plan (Proposed Plan) is being issued by the United States Environmental Protection Agency (EPA) to provide the public with EPA's preferred remedial alternative to address the 1,4-dioxane concentrations that were identified in the Borough of Bally's public water system in February 2003. EPA was able to identify 1,4-dioxane in 2003, because laboratory detection capability has improved substantially since the Bally Superfund Site was investigated in the late 1980s. Although the 1,4-dioxane concentrations identified in the water system were determined by EPA not to pose a short-term threat to human health, the presence of 1,4-dioxane was considered to represent a long-term potential threat to human health because of 1,4-dioxane's designation by EPA as a probable human carcinogen. To address this threat to human health, EPA has determined that the installation of a new municipal well is the most appropriate remedial alternative (as discussed below). When EPA has received and considered public comment regarding this alternative (as discussed below), EPA anticipates issuing an Amendment to the Record of Decision issued by EPA in 1989 ("1989 ROD"), which selected the original Superfund remedy for the Site. EPA has determined that it is necessary to amend the 1989 ROD, because the remedy selected in the ROD is not considered to be fully protective of human health due to the presence of 1,4-dioxane in the Bally public water system. Since March 2003, the Potentially Responsible Party (PRP) for the Site has provided bottled drinking water to residents who wished to limit their exposure to 1,4-dioxane.

March 13, 2007 to April 11, 2007
Public comment period on
alternatives in Proposed Plan.

March 22, 2007 at 6:30 pm
Public meeting at the Bally
Firehouse
537 Chestnut Street
Bally, PA

Under EPA oversight, a *Focused Feasibility Study (FFS)* for the Bally Ground Water Contamination Superfund (Site) has been prepared by the PRP. The Site is located in the Borough of Bally (Bally), Berks County, Pennsylvania (see Figure 1). EPA has evaluated and compared the two alternatives evaluated in the FFS that could be used to address the 1,4-dioxane contamination present in the Bally public water system. 1,4-dioxane is a Site-related contaminant which is present in ground water and in Bally's municipal supply well, and public water system. The alternatives evaluated in the FFS were: 1) the installation of a new municipal supply well in a location not contaminated by the Site, or 2) additional treatment for 1,4-dioxane at the current municipal supply well. The alternative that EPA has determined to

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be the most appropriate for addressing the 1,4-dioxane in the Bally public water system is the installation of a new municipal supply well. The new municipal supply well alternative is EPA's Preferred Alternative and is described in this Proposed Plan. The other alternative (additional treatment for 1,4-dioxane at the current municipal supply well) that was evaluated during the FFS is also discussed.

The terms in ***bold italic*** print are explained in the glossary included in the back of this Proposed Plan.

This Proposed Plan describes remedial alternatives for mitigating threats posed to human health and the environment at and from the Site. In addition, this Proposed Plan includes a summary of background information relating to the Site, describes the EPA's preferred remedial alternative, solicits public review and comment on all of the remedial alternatives described in this Proposed Plan, and provides information on how the public can be involved in the remedy selection process.

This Proposed Plan is issued by EPA, the lead agency for Site activities under the *National Oil and Hazardous Substances Pollution Contingency Plan (NCP)*, 40 C.F. R. Part 300, pursuant to the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA)*, 42 U.S.C. §§ 9601 to 9675. This Proposed Plan highlights key information from the FFS prepared by the PRP for the Site, under EPA oversight. The FFS report, as well as other documents upon which this Proposed Plan is based, is available for public inspection in an Administrative Record for the Site. The detailed *Administrative Record* can be examined at the following location:

US EPA Region III
1650 Arch Street
Philadelphia, PA 19103
(215) 814-3157

The Administrative Record File can also be accessed remotely via the internet by going to the following web site address: <http://www.epa.gov/arweb/>.

EPA and the Pennsylvania Department of Environmental Protection (PADEP) encourage the public to review and comment on each of the remedial alternatives evaluated in this Proposed Plan. EPA is providing a 30-day public comment period on this Proposed Plan. The public comment period begins on March 13, 2007 and closes on April 11, 2007. EPA will hold a public meeting to discuss this Proposed Plan at the Bally Firehouse located at 537 Chestnut Street in Bally on March 22, 2007.

EPA will summarize and respond to comments received at the public meeting and to written comments post-marked by midnight on April 11, 2007, in the Responsiveness Summary section of the ROD Amendment, which will document EPA's final selection of a cleanup remedy. Written comments, postmarked no later than midnight April 11, 2007 should be sent to:

Mitch Cron, RPM
U.S. EPA, Region III
Mail Code 3HS22
1650 Arch Street
Philadelphia, PA 19103

Toll-free: 1-800-553-2509 (x4-3286)

Email: cron.mitch@epa.gov

Although EPA has identified its preferred remedial alternative, no final decision has been made. EPA may modify the preferred alternative, select other response actions, or develop other alternatives based on comments received during this period. EPA, in consultation with PADEP, will announce the selection of a remedy for this Site in a ***Record of Decision Amendment***. EPA is the lead agency for this Site, and PADEP is the support agency.

EPA is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the NCP. This Proposed Plan fulfills the public notification requirements of CERCLA Sections 113(k)(2)(B), 117(a), and 121(f)(1)(G), 42 U.S.C. §§ 9613(k)(2)(B), 9617(a), and 9621(f)(1)(G).

Site Background

The Site consists of a former manufacturing facility, previously identified as Bally Engineered Structures (BES facility), and a plume of ***ground water*** contamination that originated from the manufacturing facility. Contaminants in ground water at the Site consist of chlorinated volatile organic compounds (VOCs), including trichloroethylene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), and 1,1-dichloroethene (1,1-DCE). The contaminant 1,4-dioxane was also identified in the ground water contamination plume in 2003 (this is explained further below).

The former BES facility is the source of ground water contamination at the Site. The facility operated as a manufacturer of various insulated cases and other products from the 1930's to approximately 1995.

Potential sources of chlorinated VOC contamination at the facility included two former storage tank systems, and former lagoon areas. No active source of contamination was identified at the former BES facility during the performance of the Remedial Investigation (1986, 1989), and it was concluded in the Record of Decision (1989 ROD) that the ground water contamination is the result of historical releases at the facility.

Between 1982 and 1989, Site-related contaminants were identified in each of Bally's two municipal wells. These wells are identified as municipal well number one (MW#1), and municipal well number three (MW#3). The most contaminated portion of the ground water contamination plume currently lies between the facility and MW#3 (see Figure 2)

On June 30, 1989, EPA issued the ROD, which documented the selected remedy for the Site. The remedy was comprised of the following components:

- Properly closing certain private wells, and restricting well use/construction within the Borough.
- Performing ground water and surface water monitoring for Site-related contaminants.
- Pumping MW#3 and treating the water for the Site-related contaminants. Treated water from MW#3 would be discharged to an unnamed tributary of the West Branch of the Perkiomen Creek or to the Bally public water system for potable use.
- Performing necessary studies to determine if additional ground water extraction wells and

treatment systems were necessary.

The remedy selected in the 1989 ROD incorporated the use of MW#3 as the extraction well for the cleanup of the ground water contamination plume, and as the public water source for Bally. The PRP has implemented the remedy selected in the ROD. Between 1987 and 1989 (prior to the issuance of the ROD) the PRP arranged for a two stage air-stripper water treatment system (air-stripper) to be constructed at MW#3. MW#3 was pumped continuously to establish hydraulic control of the plume. Water from MW#3 was treated by the air-stripper to remove VOC contamination and provided to Bally as potable water, or discharged to the unnamed tributary of the West Branch of the Perkiomen Creek. Between approximately 1989 and 2003, the remedy at the Site consisted of operation and maintenance of the air-stripper at MW#3, and ground water monitoring. In 2003, the PRP, under EPA oversight, identified 1,4-dioxane in the ground water contamination plume, and in the Bally public water system (this is explained further below). EPA requested that the PRP evaluate the Site for the presence of 1,4-dioxane because of a national effort to evaluate sites which exhibit 1,1,1-trichloroethane contamination (a Bally Site contaminant) for previously unidentified 1,4-dioxane contamination. EPA provided information to the public about the 1,4-dioxane contamination, and the progress of the FFS, during public meetings on March 19, 2003, and via fact sheets (March 2003, May 2003, August 2003, January 2004, December 2004, and October 2006). Although the 1,4-dioxane concentrations identified in the Bally public water system were not considered to pose an imminent threat to human health, the PRP agreed to provide bottled water to residents who wished to limit their exposure to 1,4-dioxane.

1,4-Dioxane Background

On February 5, 2003, at the request of EPA, water samples were collected by the PRP from the air-stripper treatment system associated with MW#3. Samples of air-stripper influent (pre-treatment) and effluent (post-treatment) were collected on February 5, 2003 by Bally maintenance personnel. The samples were analyzed using EPA Method 624 for the contaminant 1,4-dioxane. The 1,4-dioxane concentrations detected were less than 40 parts per billion (ppb) for the influent, and 53.7 parts ppb for the effluent. The results were considered inconclusive because 1,4-dioxane was detected in the air-stripper effluent, but not in the air-stripper influent. EPA and the PRP agreed to collect another effluent sample on February 12, 2003, which was analyzed for 1,4-dioxane using EPA Method 624. The concentration detected in the effluent sample was 60.5 parts per billion.

Upon receipt of these results, EPA and the PRP elected to more thoroughly evaluate 1,4-dioxane concentrations in the Bally public water system. On February 20, 2003, the PRP sampled the Bally water system at five locations: 1) untreated ground water directly from MW#3; 2) after the first air-stripping tower (50% treatment); 3) after the second air-stripping tower (100% treatment); 4) after chlorination; and 5) at the first available tap on the Bally water system. The samples were analyzed for 1,4-dioxane using EPA Method 8270C. The analytical results from the February 20, 2003 sampling event are included as follows:

Sample Location (Sample I.D.)	1,4-dioxane concentration (parts per billion)
System Influent (Bally 1)	38
50% Treatment (Bally 2)	35
100% Treatment (Bally 3)	40

Post-chlorination (Bally 4)	36
Post-chlorination duplicate (Bally Dup 1)	36
First potable tap on the system (Bally 5)	29
First potable tap on the system duplicate (Bally Dup 2)	35

To verify the above-listed analytical results, an EPA contractor performed additional sampling at the Site. On February 25, 2003, the EPA contractor visited the Site and performed sampling activities similar to those described above. The samples collected by the EPA contractor were delivered to the EPA laboratory in Ft. Meade, MD and analyzed for 1,4-dioxane using EPA Method SW846 9260 with Selective Ion Monitoring. The analytical results from the February 25, 2003 sampling event are included as follows:

Sample Location (Sample Identification #)	1,4-dioxane concentration (parts per billion)
System Influent (MW3A)	49.3
50% Treatment (MW3B)	52.2
100% Treatment (MW3C)	38.7
Post-chlorination (MW3D)	50.5
Post-chlorination duplicate (MW3E)	50.6

Since 1,4-dioxane was identified in the Bally public water system, samples of water have been collected from MW#3 and the associated air-stripper treatment system initially on a weekly basis, and later on a monthly basis. The 1,4-dioxane concentrations identified between 2003 and 2007 are similar to the concentrations identified above (minimum concentration was 24 parts per billion; maximum concentration was 77 parts per billion).

Since March 2003, the PRP for the Site has provided bottled drinking water to residents who wished to limit their exposure to 1,4-dioxane.

The Site has been separated into the following three operable units for purposes of remedy implementation:

Operable Unit One (OU1): Plume of contaminated ground water associated with the Site

Operable Unit Two (OU2): Borough of Bally public water system

Operable Unit Three (OU 3): Vapor intrusion of Site-related contaminants to indoor air (discussed below).

The purpose of this Proposed Plan is to present the preferred remedial alternative (installation of new municipal well) to address the 1,4-dioxane present in the Bally public water system (OU2). This proposed plan will also modify the ground water monitoring plan which is part of the OU1 remedy.

Summary of Preferred Alternative

The components of the preferred remedial alternative are described as follows:

Preferred Alternative for OU2 (Bally public water system) – Alternative 2: New municipal supply well

A new municipal supply well will be constructed in an uncontaminated area according to accepted industry standards, and will provide an adequate quantity of water to the Borough of Bally. Water from the new well shall meet applicable Safe Drinking Water Act requirements. The new well will be tested for contamination according to a sampling plan/schedule established by the EPA and PADEP. A pipeline will be constructed to transport water from the new well to the Bally public water system.

MW#3 will continued to be pumped to contain the existing ground water contamination plume, but will be disconnected from the Bally public water system. Pumping of MW#3 will continue so that hydraulic control of the ground water contamination plume can be maintained. Water from MW#3 will be discharged to surface water and will be required to meet National Pollutant Discharge Elimination System (NPDES) requirements. The discharge location for MW#3 is not being selected as part of this Proposed Plan. Discharge locations are being evaluated by EPA and will be documented in an appropriate EPA decision document.

Modification to OU1 remedy (Bally plume) - Ground Water Monitoring Plan and Contingency Plan

Under this preferred alternative, the existing ground water monitoring plan will be revised to accomplish two objectives: 1) evaluate the progress of the cleanup of the ground water contamination plume, and 2) confirm that the ground water contamination plume is not migrating toward the new well. In addition, a Contingency Plan will be developed to identify what corrective actions will be implemented in the event that the ground water contamination plume is confirmed to be migrating toward the new well.

Site Characteristics

The former BES facility, including three buildings and parking areas, continues to be used by various tenants for light industrial, commercial, and shipping and receiving activities.

Land use in the vicinity of the Site is primarily residential, with commercial and industrial properties present, as well as parks, recreation fields and local government facilities. The Borough of Bally covers 330 acres and has a population of approximately 1,062 people.

The ground water contamination plume consists of ground water exhibiting Site-related contaminant concentrations (including TCE, 1,1,1-TCA, 1,1-DCE, and 1,4-dioxane) in excess of the ground water performance standards listed in the ROD. These performance standards were based on the levels set forth in a PADEP Municipal Water Supply Permit and Safe Drinking Water Act (SDWA) **Maximum Contaminant Levels (MCLs)**, and are included as follows:

BALLY SUPERFUND SITE – GROUND WATER PERFORMANCE STANDARDS FROM 1989 ROD	
Contaminant	Performance Standard (parts per billion)
trichloroethylene	5 (MCL)
1,1,1-trichloroethane	200 (MCL)
tetrachloroethylene	5 (MCL)
1,1-dichloroethene	7 (MCL)
1,1-dichloroethane	Not specified
methylene chloride	5 (MCL)
1,2-dichloroethane	Not specified (however, MCL is now 5)

The most contaminated portion of the ground water contamination plume lies between the former BES facility and MW#3. The remainder of the plume extends to the southeast, generally following topography and a “stream valley” formed by unnamed tributaries of the West Branch of the Perkiomen Creek.

A map depicting the location of the former BES facility and the extent of the ground water contamination plume, based on recent ground water monitoring data for the Site, is included in Figure 2.

Review of the 1989 ROD reveals that the Site is underlain by a single, thick, unconfined (or locally semi-confined) aquifer that occurs within the limestone conglomerate and overlying residuum. Transmission of ground water is principally controlled by secondary porosity caused by fractures, joints, and solutioning activity.

The aquifer underlying the Site is currently used as a drinking water source for residents in the Borough of Bally and adjoining Washington Township. The drinking water supply for the Borough of Bally and a portion of Washington Township is currently a municipal supply well located inside the Borough limits, and identified as MW#3. MW#3 has been contaminated by the Site-related ground water contamination plume. An air-stripper treatment system is currently operated at MW#3 to remove volatile Site-related contaminants from the well water before the water is delivered to residents. The Site-related contaminant “1,4-dioxane,” which was identified in the Bally water system during February 2003, is not sufficiently volatile to be removed by the air-stripper, and therefore is still present in the water supply when it reaches the residents. Nearby residents of Washington Township which are not served by MW#3 use private wells. These homes have not been impacted by the ground water plume.

The direction of ground water flow in the bedrock aquifer is generally to the east.

Scope and Role of Response Action

The 1989 ROD documented the selected remedy for the Site, which included containment/treatment of the ground water contamination plume by the long-term pumping and treating of ground water from MW#3.

Based on EPA's current knowledge of the Site, it is appropriate to divide the Site into three separate, though related, Operable Units (OUs) to implement response actions at the Site. The Site is being divided into OUs as follows:

OU1 – Plume of Ground Water Contamination. The preferred alternative modifies the OU1 remedy set forth in the 1989 ROD and implemented by the PRP, by requiring the ground water monitoring plan to be revised to accomplish two objectives: 1) evaluate the progress of the cleanup of the ground water contamination plume, and 2) confirm that the ground water contamination plume is not migrating toward the new well. In addition, a Contingency Plan will be developed to identify what corrective actions will be implemented in the event that the ground water contamination plume is confirmed to be migrating toward the new well.

OU2 - Bally public water system: As indicated above, the Bally public water system exhibits concentrations of Site-related 1,4-dioxane. This proposed plan presents a preferred alternative (installation of a new municipal supply well) to address this condition. The current municipal supply well ("MW#3") would be disconnected from the Bally public water system when the new municipal supply well, and associated pipeline system, have been constructed and are operational. The new municipal supply well would provide an adequate quantity of potable water to the Bally public water system. Water from the new well shall meet applicable Safe Drinking Water Act requirements.

OU3 – Vapor Intrusion: EPA is currently evaluating the potential for vapor intrusion at the Site. EPA will issue a Proposed Plan for OU3 separately. Vapor intrusion can occur when chemicals present in contaminated soil or ground water vaporize and move upwards, potentially entering buildings, such as homes or businesses. When vapor intrusion does occur, it can pose a health concern. EPA has evaluated vapor intrusion at homes located near the former Bally Engineered Structures (BES) facility, and at the former BES facility. Based on testing results to date, additional testing/corrective action is not necessary for the homes, however, additional testing/corrective action may be necessary for the facility.

Summary of Site Risks

As discussed above, the reason for this Proposed Plan is the discovery of a previously unidentified contaminant, "1,4-dioxane," at the Site. 1,4-dioxane is a solvent stabilizer often associated with 1,1,1-trichloroethane (another Site-related contaminant). 1,4-dioxane is classified by EPA as a Probable Human Carcinogen.

In evaluating the need to take additional remedial action at the Bally Site, EPA has evaluated the protectiveness of the ground water performance standards included in the 1989 ROD. The performance standards for ground water (which did not include 1,4-dioxane) are included in the table above.

When these performance standards are achieved, and water is consumed by a person exhibiting contaminant concentrations at these levels, the lifetime excess cancer risk posed by the VOCs listed

in the table above is estimated to be 1 in 10,000. The NCP indicates that acceptable exposure levels for known or suspected carcinogens generally represent a lifetime excess cancer risk of between 1 in 10,000 and 1 in 1,000,000. Therefore, the performance standards listed above are protective of human health as they represent a cumulative life time excess cancer risk at upper end of the generally acceptable risk range. A "lifetime excess cancer risk" represents the risk that an individual may develop cancer because of exposure to Site-related contaminants, and is considered to be in addition to cancer risk that the entire population faces because of factors not related to the Site (genetics, lifestyle choices, such as smoking, etc).

Although concentrations vary with time, the concentrations of 1,4-dioxane present in the Bally public water system are approximately 60 parts per billion, and represent an additional lifetime excess cancer risk of 1 in 100,000.

Because the performance standards for the Site represent an excess life time cancer risk at the upper end of the acceptable cancer risk range (at 1 in 10,000), and because the presence of 1,4-dioxane represents an additional level of carcinogenic risk which may result in the cumulative risk exceeding the acceptable risk range, EPA considers it necessary to implement a remedial action at the Bally Site, to address the presence of 1,4-dioxane in the Bally public water system.

It should be noted that ground water contamination was first identified in MW#3 during October 1982. MW#3 was disconnected from the Bally public water system in December 1982. The air-stripper water treatment system was constructed at MW#3 in 1988/1989. MW#3 was reconnected to the Bally public water system in 1989. Between 1982 and 1989, the Bally public water system received water from MW#1 and from springs. Between 1982 and 1989, MW#1 also became contaminated with Site-related VOCs. It is expected that users of the Bally public water system were exposed to VOCs at concentrations above the ground water performance standards listed above prior to 1982, and at some time interval between 1982 and 1989. The historical exposures that may have theoretically increased cancer risk are another reason why EPA seeks to minimize the 1,4-dioxane risks to this population.

It should be noted that the preferred alternative described in this Proposed Plan includes the construction of a new municipal supply well outside of the area of ground water contamination associated with the Site. The construction of this new well will provide potable water to the Bally public water system which does not exhibit Site contamination. Therefore, implementation of the preferred alternative will eliminate exposure of water system users to Site-related ground water contamination and the resultant excess cancer risks.

It is the lead agency's current judgment that the Preferred Alternative identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, is necessary to protect public health or welfare or the environment from the actual or threatened releases of hazardous substances into the environment.

Remedial Action Objectives

The remedial action objectives (RAOs) describe the goals, or objectives for Site cleanup as set forth in the Proposed Plan.

The RAOs identified in the 1989 ROD were:

1. Prevention of ingestion of contaminated ground water - Prevent current and future ingestion of ground water containing unacceptable levels of volatile organic compounds.
2. Aquifer restoration - Restore the aquifer within a reasonable time frame to a condition such that levels of the VOC contaminants of concern are below remediation levels consistent with its use as a class II aquifer.

The remedy described in the 1989 ROD called for MW#3 to remain as the Borough's water supply well, however, this location has been determined to not be an acceptable location for a water supply well without additional treatment for 1,4-dioxane.

The objective for the remedial action outlined in this Proposed Plan is to reduce 1,4-dioxane concentrations in the Bally public water system to acceptable levels. This objective is consistent with the first RAO included in the 1989 ROD: Prevention of ingestion of contaminated ground water.

Summary of Alternatives

During the FFS, three alternatives were evaluated to determine the best cleanup method to reduce the 1,4-dioxane concentrations present in the Bally public water system to acceptable levels.

This evaluation was based on the information gathered during the preparation of the FFS. EPA's preferred alternative is *Alternative 2 – Installation of a new municipal supply well*.

This Proposed Plan addresses OU2 (Bally public water system). In each of the alternatives, MW#3 would continue to be pumped to maintain hydraulic control of the ground water contamination plume and to continue remediation of the ground water contamination plume by extraction and treatment. Under Alternative 2, MW#3 would be disconnected from the Bally public water system, and all water pumped from MW#3 would be discharged to surface water. Under Alternative 3, water pumped from MW#3 would be treated for Site-related contaminants (including 1,4-dioxane) and delivered to the Bally public water system as potable water. Whatever water was not used by the Bally public water system under Alternative 3 would be discharged to surface water. In each case, discharges to surface water would be subject to NPDES requirements. The discharge location for MW#3 is not being selected as part of this Proposed Plan. Discharge locations are being evaluated by EPA and will be documented in an appropriate EPA decision document.

The following section is a summary of the three remedial alternatives that were considered during the FFS and their associated costs.

Alternative 1 - No Action Alternative

<i>Capital Cost:</i>	\$0
<i>Annual Operation and Maintenance (O&M) Costs:</i>	\$0
<i>Total O&M Costs:</i>	\$0
<i>Total Present Worth Cost:</i>	\$0

Under this alternative, no remedial measures would be implemented at the Site to prevent exposure to the 1,4-dioxane contamination present in the Bally public water system. The “no action” alternative is included because the NCP requires that a “no action” alternative be developed as a baseline for evaluating other remedial alternatives.

This alternative would not reduce the 1,4-dioxane present in the Bally public water system to acceptable levels. This alternative would not be protective of human health, and will not be considered further.

Alternative 2 – Installation of a New Municipal Supply Well

<i>Capital Cost:</i>	\$1,750,001
<i>Annual Operation and Maintenance (O&M) Costs:</i>	\$58,000
<i>Total O&M Costs:</i>	\$1,740,000
<i>Total Present Worth Cost:</i>	\$2,833,267

Under this alternative, a new municipal supply well would be installed in a location not contaminated by the Site. The new municipal supply well would provide an adequate quantity of potable water to the Bally public water system that meets the appropriate drinking water standards. As part of this alternative, the OU-1 ground water monitoring plan would be revised as part of the remedial design and implemented to confirm that the operation of the new municipal supply well is not drawing in the Site-related ground water contamination plume. In addition, as part of this alternative, a contingency plan would be prepared outlining what corrective actions would be taken in the event that the ground water monitoring program determined that the operation of the new municipal supply well was drawing in the ground water contamination plume. MW#3 will continued to be pumped to contain the existing ground water contamination plume, but will be disconnected from the Bally public water system. Pumping of MW#3 will continue so that hydraulic control of the ground water contamination plume can be maintained, and remediation of the ground water contamination plume by extraction and treatment will continue. Water from MW#3 will be discharged to surface water and will be required to meet National Pollutant Discharge Elimination System (NPDES) requirements. The discharge location for MW#3 is not being selected as part of this Proposed Plan. Discharge locations are being evaluated by EPA and will be documented in an appropriate EPA decision document.

Alternative 3 – Additional treatment of current Municipal Supply Well

<i>Capital Cost:</i>	\$947,000
<i>Annual Operation and Maintenance (O&M) Costs:</i>	\$247,700
<i>Total O&M Costs:</i>	\$7,431,000
<i>Total Present Worth Cost:</i>	\$5,561,000

Under this alternative, an additional water treatment system would be added at the existing municipal supply well (MW#3). A variety of water treatment technologies, broadly described as Advanced Oxidation Processes (AOP), were evaluated during the FFS. One AOP technology, Ultraviolet radiation (UV) and Hydrogen Peroxide treatment, was selected during the FFS for detailed analysis

as the most promising AOP water treatment method for the Bally public water system. Basically, UV/Hydrogen Peroxide treatment involves adding hydrogen peroxide to the contaminated water and exposing the mixture to UV radiation. The UV radiation causes the release of very reactive chemical constituents, called hydroxyl radicals, from the hydrogen peroxide which react with the 1,4-dioxane to create harmless reaction byproducts, including carbon dioxide, water, and residual chloride. A concern associated with this remedial alternative is the creation of low levels of formaldehyde that were observed during a pilot test of this water treatment technology. Under this alternative, MW#3 would continue to act as the extraction well for the ground water contamination plume and the Bally municipal supply well. A monitoring plan would be created as part of this alternative to confirm that the water treatment systems at MW#3 (the air-stripper treatment system, plus the UV/Hydrogen Peroxide treatment system) are reducing Site related contaminant concentrations to acceptable levels. MW#3 would continue to pump at the rate necessary to maintain hydraulic control of the ground water contamination plume. Whatever water was not used by Bally would be discharged to surface water. This discharge would be required to meet NPDES requirements.

Evaluation of Alternatives

In this section, EPA evaluated the alternatives in detail to determine which alternative would be the most effective in achieving the goals of CERCLA, and in particular, achieving the remedial action objectives established for the Site. EPA uses nine criteria to evaluate cleanup alternatives in order to select a remedy. Below is a description of each of the nine criteria set forth in the NCP, 40 CFR § 300.430(e)(9). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria.

Threshold Criteria:

1. *Overall Protection of Human Health and the Environment* addresses whether a remedy provides adequate protection to human health and the environment and describes how risks are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. *Compliance with ARARs* addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of environmental statutes, regulations, and/or whether there are grounds for invoking a waiver.

Primary Balancing Criteria:

3. *Long-term Effectiveness* refers to the ability of a remedy to maintain reliable protection of human health and the environment, over time, once cleanup goals are achieved.
4. *Reduction of Toxicity, Mobility, or Volume through Treatment* addresses the degree to which alternative treatments will reduce the toxicity, mobility, or volume of the contaminants causing Site-related risks.
5. *Short-term Effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and environment that may be posed during the construction and

implementation period.

6. *Implementability* addresses the level of technical and administrative difficulty associated with completing a remedy, including whether materials and services needed to implement a particular option are readily available.

7. *Cost* includes estimated capital (startup) costs, as well as operation and maintenance costs, and are usually combined and presented as the Total Net Present Worth Cost.

Modifying Criteria:

8. *State Acceptance* indicates whether, based on its review of supporting documents and the Proposed Plan, the State supports, opposes, or has no comment on the preferred alternative.

9. *Community Acceptance* will be assessed in the ROD following a review of public comments received on the Proposed Plan and supporting documents included in the Administrative Record.

Overall Protection of Human Health and the Environment

CERCLA requires that the selected remedial action be protective of human health and the environment. An alternative is protective if current and potential future risks associated with each exposure pathway at a Site are reduced to acceptable levels. An exposure pathway refers to the way in which a person or other living organism can come into contact with contaminants.

Under Alternative 2, exposure of residents to 1,4-dioxane via the Bally public water system would be eliminated, because the water system would receive water from a municipal supply well not contaminated by the Site-related ground water contamination plume. Alternative 2 would require an alternative-specific ground water monitoring plan to confirm that operation of the new municipal supply well is not drawing the ground water contamination plume toward the new well. In addition, a contingency plan would have to be established to determine what corrective actions would be appropriate in the event that the ground water monitoring program did confirm that such plume migration was occurring.

Alternative 3 would require extensive monitoring to ensure that Site-related contaminants are reduced to acceptable levels by the water treatment systems at MW#3 (air-stripper treatment system, and UV/Hydrogen Peroxide treatment system) prior to use by the Bally public water system. In addition, extensive pilot testing, treatment system design, and treatment system monitoring would be required to confirm that treatment byproducts (such as formaldehyde) are not being generated at concentrations of concern to human health or the environment.

In terms of overall protection of human health and the environment, Alternative 2 is superior to Alternative 3, because drinking water standards will be met without operation and maintenance/oversight of an additional water treatment system (in addition to the air-stripper) to address the 1,4-dioxane and potential treatment residuals (such as formaldehyde).

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Any cleanup alternative selected by EPA must comply with all applicable or relevant and appropriate

federal and state environmental requirements. *Applicable* requirements are those substantive environmental standards, requirements, criteria, or limitations promulgated under federal or state law that can be legally applied to the remedial action to be implemented at the Site. *Relevant and appropriate* requirements, while not being directly applicable, address problems or situations sufficiently similar to those encountered at the Site that their use is well-suited to the particular Site. EPA may waive an ARAR under certain conditions; however, EPA is not waiving any ARARs for this Site.

The following are the major ARARs that are expected to be applicable to the Site:

- PA Code Chapter 92 (NPDES)
- PA Code 109 Safe Drinking Water (various Sections including Section 109.202 – State MCLs and Treatment Technique Requirements; Section 109.301 – Monitoring; Section 109.501 – Permit Requirement; Section 109.601 Design and Construction Standards)
- PA Code Chapter 105 (Regulation and Supervision of dams, reservoirs, water obstructions, and encroachments in water of the Commonwealth, including wetlands)
- 40 CFR 6.302(b), Executive Order No. 11988 (minimize long and short term adverse impacts to floodplains)
- 40 CFR 6.302(a), 40 CFR 6 Appendix A, Executive Order No. 11990, 40 CFR 230.3(t) (protection of wetlands)

As stated above, EPA does not anticipate a need to waive ARARs associated with either alternative. Therefore, it is expected that Alternatives 2 and 3 will comply with ARARs.

Long-Term Effectiveness and Permanence

The evaluation of alternatives under this criterion considers the ability of an alternative to maintain protection of human health and the environment over time, usually measured in one or more decades. The evaluation takes into account the residual risk remaining from untreated waste at the conclusion of remedial activities, as well as the adequacy and reliability of containment systems and institutional controls.

Each of the two alternatives require long-term monitoring to confirm that the remedial action is protective of human health. Alternative 2 would require the modification and implementation of the OU1 ground water monitoring plan and contingency plan (discussed above). Alternative 3 would require extensive monitoring to ensure that Site-related contaminants are reduced to acceptable levels by the water treatment systems at MW#3 (air-stripper treatment system, and UV/Hydrogen Peroxide treatment system) prior to use by the Bally public water system. In addition, extensive pilot testing, treatment system design, and treatment system monitoring would be required to confirm that treatment byproducts (such as formaldehyde) are not being generated at concentrations of concern to human health or the environment.

As part of the FFS, extensive aquifer testing was performed at a preferred well location north of Bally. The results of the aquifer testing strongly indicated that long-term operation of a new municipal well at that location would not result in migration of the ground water contamination plume towards the new well. In addition, if such plume migration was confirmed to be occurring by ground water monitoring, it appears that sufficient time would exist to implement corrective actions. Therefore, Alternative 2 is expected to be superior to Alternative 3 in terms of long-term

effectiveness and Permanence regarding a potable water supply to current consumers.

Reduction in Toxicity, Mobility, or Volume through Treatment

This evaluation criterion addresses the *statutory* preference for selecting remedial actions that employ treatment technologies that permanently or significantly reduce the toxicity, mobility, or volume of hazardous substances as their principal element.

Alternative 2 would reduce 1,4-dioxane concentrations in the Bally public water system by the installation of a new municipal supply well and extracting water from a portion of the local aquifer which is uncontaminated by the Bally Superfund Site. However, treatment of 1,4-dioxane is not an element of Alternative 2, because 1,4-dioxane would not be present in the new municipal supply well. Alternative 3 would reduce 1,4-dioxane concentrations in the current Bally public water system by treating 1,4-dioxane at the current municipal supply well (MW#3) to an acceptable concentration.

Short-Term Effectiveness

This evaluation criterion addresses the effects of the alternatives during the construction and implementation phase until remedial action objectives are implemented. The criterion considers risks to the community and to on-Site workers. It also considers available mitigation measures, as well as the time frame for the attainment of the response objectives.

It is not expected that the remedial actions outlined in Alternative 2 or 3 would require protection of the community or workers beyond that which is normally required during construction projects. Alternative 2 would require the construction of a new municipal supply well and a pipeline to convey water from the new municipal supply well to the Bally public water system. As part of Alternative 2, there is the potential to impact wetlands during these construction activities. However, construction activities would be performed pursuant to appropriate requirements to mitigate impacts to wetlands. Alternative 3 would require the pilot testing, design and construction of an additional treatment system at the current municipal supply well. No impacts to wetlands are expected to be associated with Alternative 3, although the proximity of MW#3 to recreational areas (parks, baseball fields) would have to be considered during construction activities. It is expected that the implementation of Alternative 2 would take approximately one-year (including well construction, well house construction, pipeline construction, permitting, etc), and implementation of Alternative 3 would take 3-6 months.

Implementability

The evaluation of alternatives under this criterion considers the technical and administrative feasibility of implementing an alternative and the availability of services and materials required during implementation. Each of the alternatives is implementable, and the services and materials required for each alternative are available. However, some would be more difficult to implement than others.

Alternative 2 involves the construction of a new municipal supply well, and a pipeline to convey water to the Bally public water system. Therefore, Alternative 2 is expected to use standard industry construction techniques and standards to achieve implementation of the alternative. A preferred well location has been identified and it is expected that Alternative 2 can be implemented with relative

ease. It is expected that a revised ground water monitoring plan/schedule will allow for sufficient plume monitoring. In addition, if plume migration is determined to be occurring, it is expected that effective corrective actions can be established as part of a contingency plan. In addition, it is expected that local vendors are available who can provide the construction services necessary to accomplish Alternative 2.

Under Alternative 3, pilot testing of the additional water treatment system would be required to confirm that 1,4-dioxane can be reduced to acceptable levels by UV/Hydrogen Peroxide treatment. In addition, sufficient pilot testing/design/treatment system monitoring would be required to confirm that treatment residuals (including formaldehyde) are not being created at unacceptable levels. Subsequent to successful pilot testing of the UV/Hydrogen Peroxide Treatment System, it is expected that design and construction of a full-scale treatment system could be performed with relative ease by national vendors.

Cost

The costs included below summarize the capital, annual O&M, and total present worth costs for each alternative. The total present worth is based on an O&M time period of 30 years for the constructed elements of the alternative (new well, or treatment system at MW#3) and environmental monitoring. For additional details on the cost estimate breakdown, please refer to the Administrative Record.

From a cost perspective, Alternative 2 (Total Present Worth = \$2,833,267) is more cost effective than Alternative 3 (Total Present Worth = \$5,561,000) for achieving the remedial action objective specified above.

State Acceptance

State acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD.

Community Acceptance

Community acceptance of the preferred alternative will be evaluated after the public comment period ends and will be described in the ROD. However, it should be noted that the community has generally expressed a strong preference for Alternative 2.

Summary of the Preferred Alternative - Alternative 2, Total Present Worth= \$2,833,267.

EPA's preferred alternative for OU1 of the Bally Ground Water Contamination Site is Alternative 2 – ***Installation of a New Municipal Supply Well.*** EPA's preferred alternative includes the following:

Preferred Alternative for OU2 (Bally public water system) - New municipal supply well

A new municipal supply well will be constructed in an uncontaminated area according to accepted industry standards, and will provide an adequate quantity of water to the Borough of Bally. Water from the new well shall meet applicable Safe Drinking Water Act requirements. The new well will be tested for contamination according to a sampling plan/schedule established by the EPA and PADEP. A pipeline will be constructed to transport water from the new well to the Bally water system.

MW#3 will continue to be pumped pursuant to the 1989 ROD to contain the existing ground water contamination plume, but will be disconnected from the Bally public water system.

(Modification to 1989 ROD OUI remedy (Bally plume) - Ground Water Monitoring Plan and Contingency Plan

Under this preferred alternative, the existing ground water monitoring plan will be revised to accomplish two objectives: 1) evaluate the progress of the cleanup of the ground water contamination plume, and 2) confirm that the ground water contamination plume is not migrating toward the new well. In addition, a Contingency Plan will be developed to identify what corrective actions will be implemented in the event that the ground water contamination plume is confirmed to be migrating toward the new well.

EPA's preferred alternative would satisfy the statutory requirements of CERCLA §121(b) by being protective of human health and the environment; complying with ARARs; being cost-effective; utilizing permanent solutions and alternative treatment technologies to the maximum extent practicable; and satisfying the preference for treatment as a principal element. EPA's preferred alternative could be modified or changed in response to state comments, public comments, or new information. **The total present worth cost of EPA's preferred alternative is \$2,833,267.**

Community Participation

This Proposed Plan is being distributed to solicit public comment on the appropriate cleanup action for the Site. EPA relies on public input so that the remedy selected for each Superfund Site addresses the concerns of the local community. EPA is providing a 30-day public comment period beginning on March 13, 2007, and ending on April 11, 2007, to encourage public participation in the Superfund remedy selection process. EPA will conduct a public meeting during the comment period in order to present the Proposed Plan and supporting information, answer questions, and accept both oral and written comments from the public. The public meeting will be held on March 22, 2007, at the Bally Firehouse, 537 Chestnut Street, Bally, PA, at 6:30 p.m.

EPA will summarize and respond to relevant comments received at the public meeting and to written comments post-marked by midnight on April 11, 2007, in the Responsiveness Summary section of the ROD Amendment, which will document EPA's final selection of a clean-up remedy. To obtain additional information relating to this Proposed Plan, please contact either of the following EPA representatives:

Alicia Walls (3HS52)
Community Involvement Coordinator
U.S. EPA - Region III
1650 Arch Street
Philadelphia, PA 19103
Phone: 215-814-3135

Mitch Cron (3HS22)
Remedial Project Manager
U.S. EPA - Region III
1650 Arch Street
Philadelphia, PA 19103
Phone: 215-814-3286

Toll-free: 1-800-553-2509 (x45525 or x43286)

The detailed Administrative Record can be examined at the following locations:

US EPA Region III
1650 Arch Street
Philadelphia, PA 19103
(215) 814-3157

The Administrative Record File can also be accessed remotely via the internet by going to the following web site address: <http://www.epa.gov/arweb/>.

Glossary

Administrative Record: EPA's official compilation of documents, data, reports, and other information that is considered important to the status, and decisions made, relating to a Superfund Site. The record is placed in the information repository to allow public access to the material.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): A federal law passed in 1980 and amended several times subsequently. The Act created a Trust Fund, known as Superfund, with funds available to investigate and clean up abandoned or uncontrolled hazardous waste sites.

Focused Feasibility Study (FS): A report that identifies and evaluates alternatives for addressing specific contamination that presents unacceptable risks at a Superfund site.

Groundwater: The water beneath the earth's surface that flows through the soil and rock openings and often serves as a source of drinking water.

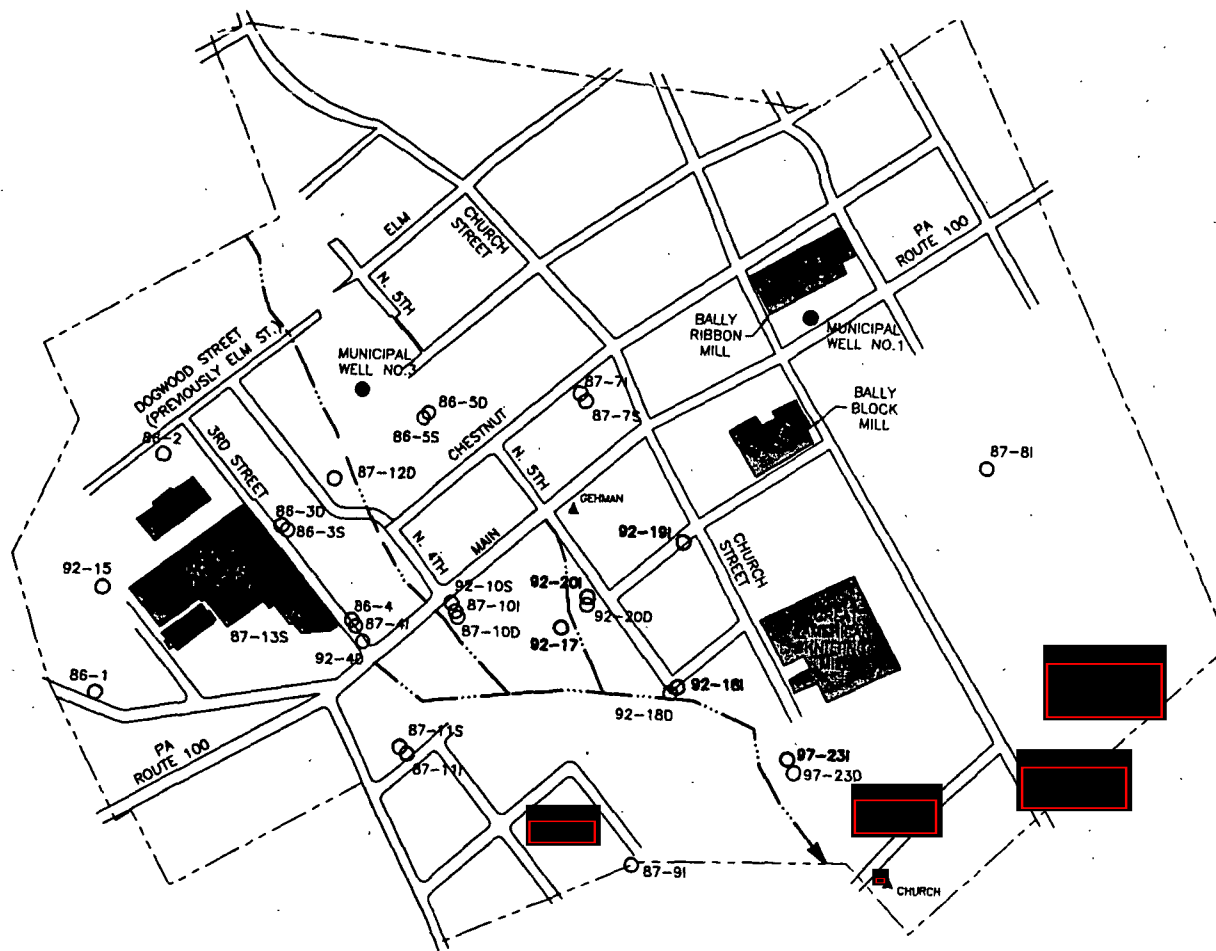
Maximum Contaminant Levels (MCLs): Enforceable standards for public drinking water supplies under the Safe Drinking Water Act. These standards apply to specific contaminants which EPA has determined have an adverse effect on human health above certain levels.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The federal regulations found at 40 C.F.R. Part 300 that provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants and contaminants under the Superfund program.

Record of Decision (ROD) Amendment: A ROD is public document that describes the remedial actions selected for a Superfund Site, why certain remedial actions were chosen as opposed to others, and how much they will cost. The ROD summarizes the results of the Remedial Investigation and Feasibility Study reports and the comments received during the comment period for the Proposed Plan. A ROD Amendment is a public document that describes a fundamental change to a Superfund remedy described in the ROD.

Bally Ground Water Contamination Superfund Site
Proposed Remedial Action Plan
March 2007

Figure 1.



LEGEND

- EXISTING MONITORING WELLS
- MONITORING WELL PART OF SOUTHERN AREA MONITORING PROGRAM
- ▲ PRIVATE OR INDUSTRIAL WELL
- EXISTING AND PROPOSED MUNICIPAL WELL
- BOROUGH BOUNDARY
- STREAM

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SCALE IN FEET

NO. DATE REVISION DESCRIPTION BY

ARCADIS



AMERICAN HOUSEHOLD
BALLY GROUNDWATER SITE
BALLY BOROUGH
BERKS COUNTY, PENNSYLVANIA

DRAWN M. BRADLEY	DATE 11/08/04	PROJECT MANAGER M. BRADLEY	DEPARTMENT MANAGER M. BRADLEY
LEAD DESIGN PROF. F. LUDWIG	CHECKED C. SHAPIRO	PROJECT NUMBER NP00597.002	DRAWING NUMBER 2

MONITORING WELL NETWORK

Bally Ground Water Contamination Superfund Site
Proposed Remedial Action Plan
March 2007

Figure 2.

92-20	3/28/05
1,4 Dioxane	<2.8
1,1-Dichloroethene	4.6
Trichloroethene	8.4
1,1,1-Trichloroethene	3.6
Methylene Chloride	<5.0

92-19	3/28/05
1,4 Dioxane	<2.8
1,1-Dichloroethene	2.0
Trichloroethene	2.3
1,1,1-Trichloroethene	1.6
Methylene Chloride	<5.0

92-17	3/28/05
1,4 Dioxane	<2.8
1,1-Dichloroethene	1.7
Trichloroethene	3.1
1,1,1-Trichloroethene	0.45
Methylene Chloride	<5.0

92-18	3/28/05
1,4 Dioxane	<2.8
1,1-Dichloroethene	5.7
Trichloroethene	17.0
1,1,1-Trichloroethene	4.5
Methylene Chloride	<5.0

97-23	3/28/05
1,4 Dioxane	<2.8
1,1-Dichloroethene	<1.0
Trichloroethene	<1.0
1,1,1-Trichloroethene	1.0
Methylene Chloride	<5.0

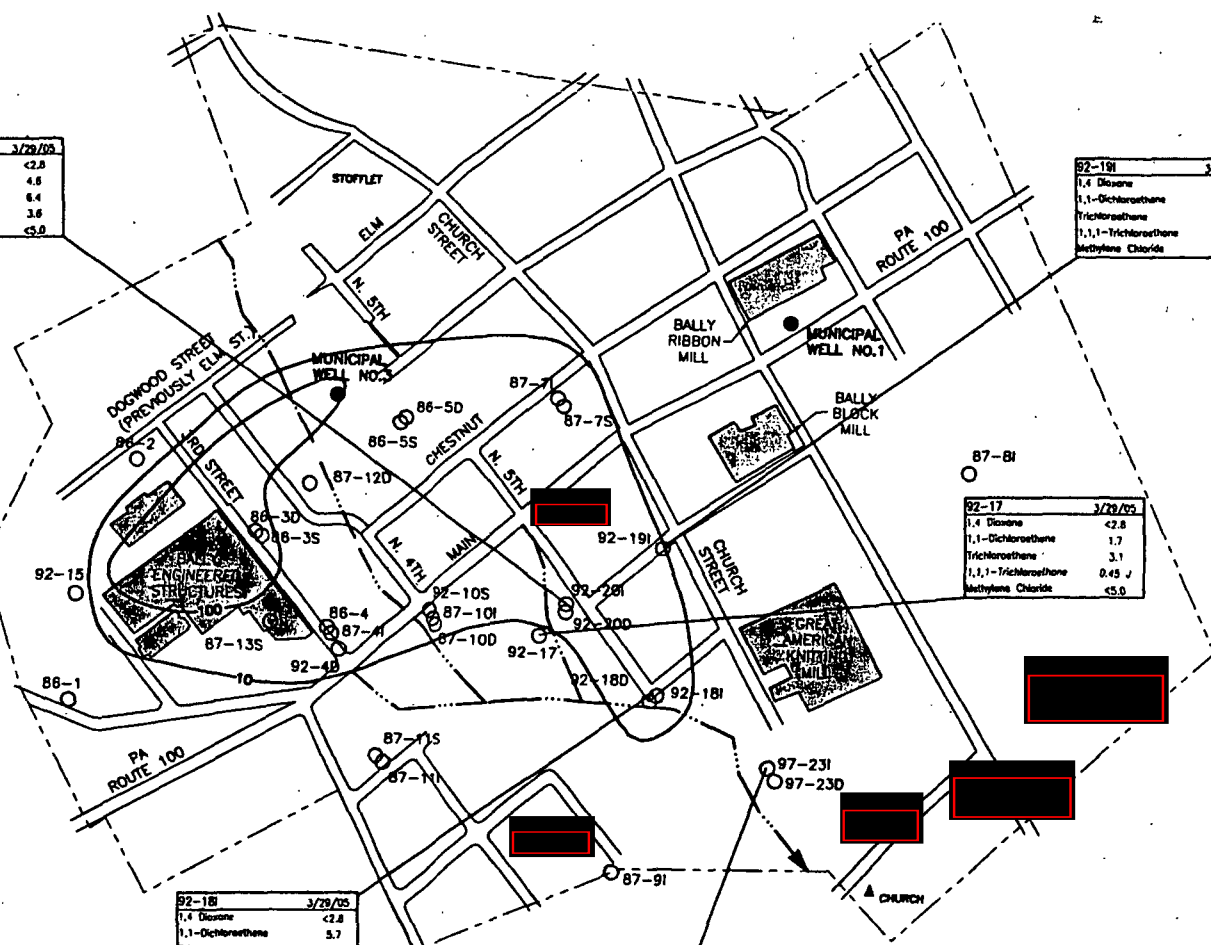
LEGEND

- EXISTING MONITORING WELLS
- ▲ PRIVATE OR INDUSTRIAL WELL
- EXISTING AND PROPOSED MUNICIPAL WELL
- TOTAL VOC CONTOUR
- STREAM

WELL ID	SAMPLE DATE	EPA MCL STANDARDS (ug/L)
97-81	10/7/2004	1,4 Dioxane 3**
		1,1-Dichloroethene 7
		Trichloroethene 5
		Tetrachloroethene 5
		1,1,1-Trichloroethene 200

** - No MCL EXISTS PRESENTLY FOR 1,4-DIOXANE. THE 3 PPB VALUE IS PROPOSED BY EPA.

CONCENTRATION (MICROGRAMS PER LITER (ug/L))



0 500
SCALE IN FEET

ARCADIS



AMERICAN HOUSEHOLD
BALLY GROUNDWATER SITE
BALLY BOROUGH
BERKS COUNTY, PENNSYLVANIA

DRAWN M. WASHLEW	DATE 11/08/04	PROJECT MANAGER M. REHARD	DEPARTMENT MANAGER M. REHARD
ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES COLLECTED FROM MONITORING WELLS MARCH, 2005		LEAD DESIGN PROJ. F. LIDZO	CHECKED C. SHAMPE
		PROJECT NUMBER NP00568.002	DRAWING NUMBER 6